Do not enter.

C1

PREPOLYMER COMPOSITION FOR INSULATING FOAMS

Sub D1

RELATED APPLICATIONS

This application is a continuation of U.S. Ser. No. 08/501,020 filed October 16, 1995, now abandoned, which is a Continuation of PCT/EP94/00385 filed February 10, 1994, which have priority on DE applications German P43 03 894.2 filed February 10, 1993 and German P43 03 848.4 filed February 10, 1993.

BACKGROUND

This invention relates to a prepolymer composition for producing polyurethane insulating foams with fire-retardant properties from pressure tanks which consists of a prepolymer component with at least one PU prepolymer with a content of NCO groups of 4 to 20 wt% and usual additives as well as a propellant component. The invention furthermore relates to the use of softening phosphates and phosphonates as a fireretardant additive to prepolymer compositions for producing pressure-can polyurethane insulating foams, as well as to pressure cans with such a prepolymer composition for producing polyurethane insulating foams.

Sub D2

The inventive prepolymer composition is used for producing polyurethane insulating foams which are used particularly for insulating purposes by foaming in cavities. The main areas of application are the construction industry, but also technical products in which cavities must be filled to avoid condensation nests. When one-component polyurethane foams are spoken of, these are applied by discharging the prepolymer composition from pressure tanks, for example aerosol cans, on the spot with the help of propellants with a bulk density of 10 to 50 g/l, and processed. One component
foams are moisture-hardening, i.e. they can be cured solely with the help of the moisture contained in the air.

Two-component polyurethane foams require a second hydroxy component for curing the prepolymer composition, gene rally a polyol which must be added directly before foam formation. Curing can be accelerated by

Sub D2 catalysts. Bulk densities in two component foams are characteristically 10 to 100 g/l.

Sub D3 Transitional forms between one component (1C) and two component (2C) (herinafter (1C) and (2C)) foams are possible. In this case a quantity of a hydroxyl-component insufficient for reacting the isocyanate groups is added to the prepolymer before discharge. Such "transitional foams (hereinafter referred to as 1.5C foams or 1.5C)" are also covered by the invention.

Conventional prepolymer compositions for 1C and 2C polyurethane insulating foams contain a prepolymer component having a minimum content of reactive NCO groups. The prepolymer itself is a polymer of suitable viscosity with terminal NCO groups. Suitable isocyanates are for example isophorone dusocyanate, referred to as IPDI, tolylene diisocyanate, also referred to as TDI, diisocyanatotoluene, 1,5-diisocyanatonaphthalene, referred to as NDI, triisocyanatotrimethylmethane, 1,6-diisocyanatohexane, referred to as HDI, or 4,4diisocyanatodiphenylmethane in a raw and pure form or as a mixture. An especially common one is 4,4-diisocyanatodiphenylmethane, also referred to as MDI, which is used both in a raw form (raw MDI) and in the form of pure 2,4- and 4,4-isomers or mixtures thereof. One can likewise use the two common TDI isomers alone or in a mixture. For producing the prepolymer component one reacts such isocyanates with hydroxy polyethers, polyesters or polyvalent alcohols, making sure the prepolymer acquires a viscosity suitable for the composition.

Insulating foams to be used in the construction industry, so-called B2 foams, must be set to be fire-retardant according to the national specifications. This is usually done by adding fire-retardant substances to the foaming materials, in particular chlorine- and bromine-containing organic compounds. Particularly well-known ones are chlorine and bromine derivatives from diphenyl ether and biphenyl, for example pentabromobiphenyl ether and polychlorinated biphenyls. Despite their

constitutes 5 to 40 wt%. The propellant content is 5 to 40 wt% of the prepolymer composition. The $C0_2$ content in the propellant can be for example about 5 wt%, based on the total propellant component. The content of gases not condensable under the prevailing pressure conditions should be such that the volume based on the empty space in the pressure tank yields a pressure of about 8 to 10 bars, depending on the relevant national specification for pressure tanks (aerosol cans). The empty space in the pressure tank is the space assumed by the uncondensed components of the prepolymer composition.

The liquid butadiene is optionally added to the prepolymer composition in solution along with an emulsifier - for example in a weight ratio of 80/20-, preferably in solution with a hydroxy vegetable oil suitable for controlling the isocyanate content of the PU prepolymer. The liquid polybutadiene has a content of 0.01 to 2 wt% of the prepolymer composition. It has proven especially suitable to use castor oil with a hydroxyl number of 160, but any other hydroxy vegetable oils and hydroxy polyethers and polyesters can also be used. These are hydroxy components as are conventionally used for modifying viscosity in the formulation of prepolymer compositions.

The inventive prepolymer compositions can be used as 1C, 1 .5C and 2C polyurethane foams. With 2C foams the polyol component required for curing the foam, and optionally a further component, are kept separate from the prepolymer composition in known fashion and added only directly before or during discharge. The corresponding methods are widely described and known to the expert, as are suitable two-component pressure cans with a separate tank for the second component.

The second component can be in particular usual polyols, in particular glycol, glycerine and butanediol. To accelerate the curing reaction it may be expedient to add to this second component a usual catalyst, for example tin dioctoate, cobalt naphtlienate and octoate, dibutyl tin dilaurate, metallic, in